pp. 239–244

Contribution to the knowledge of aquatic bugs (Hemiptera: Heteroptera) from Wallacea and New Guinea, with ecological notes

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Abstract: The present paper contains information on 18 taxa, including 13 species and 5 genus-rank identifications of Heteroptera from the Wallacea region and New Guinea based on personal observations and museum material. When possible, supplementary information on habitat is given, and morphological variation in *Ranatra biroi* Lundblad, 1933 is discussed.

Key words: Heteroptera, aquatic bugs, faunistics, distribution, ecology, morphology.

Introduction

Over time, the author has accumulated observations on Heteroptera Latreille, 1810 from Wallacea and adjacent areas. The material discussed in the present paper is not the result of extensive Heteroptera-targeted research, but, considering the present relatively low knowledge level of research in the region, the author believes that publishing even a relatively small amount of precise data and sharing them with the scientific community is welcome. As demonstrated for some other invertebrates, small amounts of random data form a larger dataset over time and contribute well to regional studies and the general knowledge of the taxonomic group.

Material and methods

Data on aquatic bugs were obtained by processing material from the author’s and museum collections of Heteroptera. The origin of the studied material is New Guinea (Doberai Peninsula: Aitinyo; Bomberai Peninsula: Fak-Fak; Bird’s Neck Isthmus: Kaimana, Kamakawalar, Oray; mainland Papua: Oksibil, Setani), Misool in Raja Ampat Islands (Aduwey) and Halmahera (Lina) in North Moluccas (Map 1). Specimens were identified by Dan A. Polhemus in 2011–2020, except for *Lethocerus insulanus* identified by Dmitry Telnov in 2010.

Aquatic bugs were mainly sampled with a hydrobiological net in the littoral zone of various water bodies. The only exception is the *Lethocerus insulanus* attracted to white light. The material discussed is mainly deposited at the Naturkundemuseum Erfurt, Germany.

The term “Papuan Region” (or in the strict zoogeographic sense – the Papuan subregion of the Australian Region) is often listed in zoological or zoogeographic literature, but sometimes extended to include some adjacent areas. Therefore, for the purposes of this paper, the terms used by Greķe & Telnov (2014) – Papua *sensu lato* and Papua *sensu stricto* – are used (Map 2).

Results

Heteroptera Latreille, 1810
Belostomatidae Leach, 1815

***Diplonychus eques* (Dufour, 1863)** (Fig. 1)
Studied material: 1 (immature) INDONESIA, West Papua Prov., Kaimana 47 km E, Triton Bay, Kamaka (former Warika) village environs, Lake Kamakawalar and surroundings, 3°46’22”S, 134°12’02”E, 60–310 m, little ditch in primary lowland forest on limestone, 08.09.2010; 3 specimens INDONESIA E, West New Guinea, Doberai Peninsula, Ayamaru vill. 27 km SE, Aitinyo (Uter) lakeside, 1°26’01”S, 132°23’10”E, ~175-177 m, from aquatic vegetation, 04.09.2015; 2♀ INDONESIA E, New Guinea, Papua Prov., Star Mountains, Oksibil

23 km SSE, Beringin vill., 05°05’01”S, 140°43’27”E, 310 m, edge of secondary lowland rainforest, MV light, 12.03.2018.

Note: Widespread in Australia and New Guinea. May be conspecific with the very widespread *D. rusticus* (Fabricius 1781) (India to Australia) (Andersen & Weir 2004).

Lethocerus insulanus (Montandon, 1898)

Studied material: 1♂ INDONESIA E, Prov. Raja Ampat, Misool SW, Aduwey (Aduai) vill. ~2 km NNW, valley of River Hakau, 01°58’21”S, 129°54’30”E, in lowland rain forest, on UV light, 25.03.2009.

Note: The species inhabits relatively wide areas of Australia and also recorded from surroundings of Port Moresby in Papua New Guinea (Insecta in GBIF Secretariat 2019), Maprik, E Sepik province (Buzzetti *et al*. 2006), from New Caledonia (Damgaard & Zettel 2014) and Philippines (Andersen & Weir 2004). First record for the fauna of Misool and Raja Ampat Islands.

Gerridae Leach, 1815

Limnogonus darthulus (Kirkaldy, 1901)

Studied material: 1♂ & 1♀ INDONESIA, West Papua Prov., Kaimana 47 km E, Triton Bay, Kamaka (former Warika) village environs, Lake Kamakawalar and surroundings, 3°46’22”S, 134°12’02”E, 60–310 m, little ditch in primary lowland forest on limestone, 08.09.2010.

Limnogonus fossarum skusei (Torre-Bueno, 1926)

Studied material: 3♂ INDONESIA, West Papua Prov., Kaimana 47 km E, Triton Bay, Kamaka (former Warika) village environs, Lake Kamakawalar and surroundings, 3°46’22”S, 134°12’02”E, 60-310 m, little ditch in primary lowland forest on limestone, 08.09.2010.

Limnometra kallisto (Kirkaldy, 1899)

Studied material: 7♂ & 13♀ INDONESIA, West Papua Prov., Kaimana 47 km E, Triton Bay, Kamaka (former Warika) village environs, Lake Kamakawalar, 3°45’33”S, 134°12’05”E, 90 m, 2nd pool in primary lowland rainforest, 09.09.2010; 2♂ & 4♀ INDONESIA, West Papua Prov., Kaimana 7-9 km NW, sago swamp, 3°35’02”S, 133°42’58”E, 05.09.2010; 2♂ & 4♀

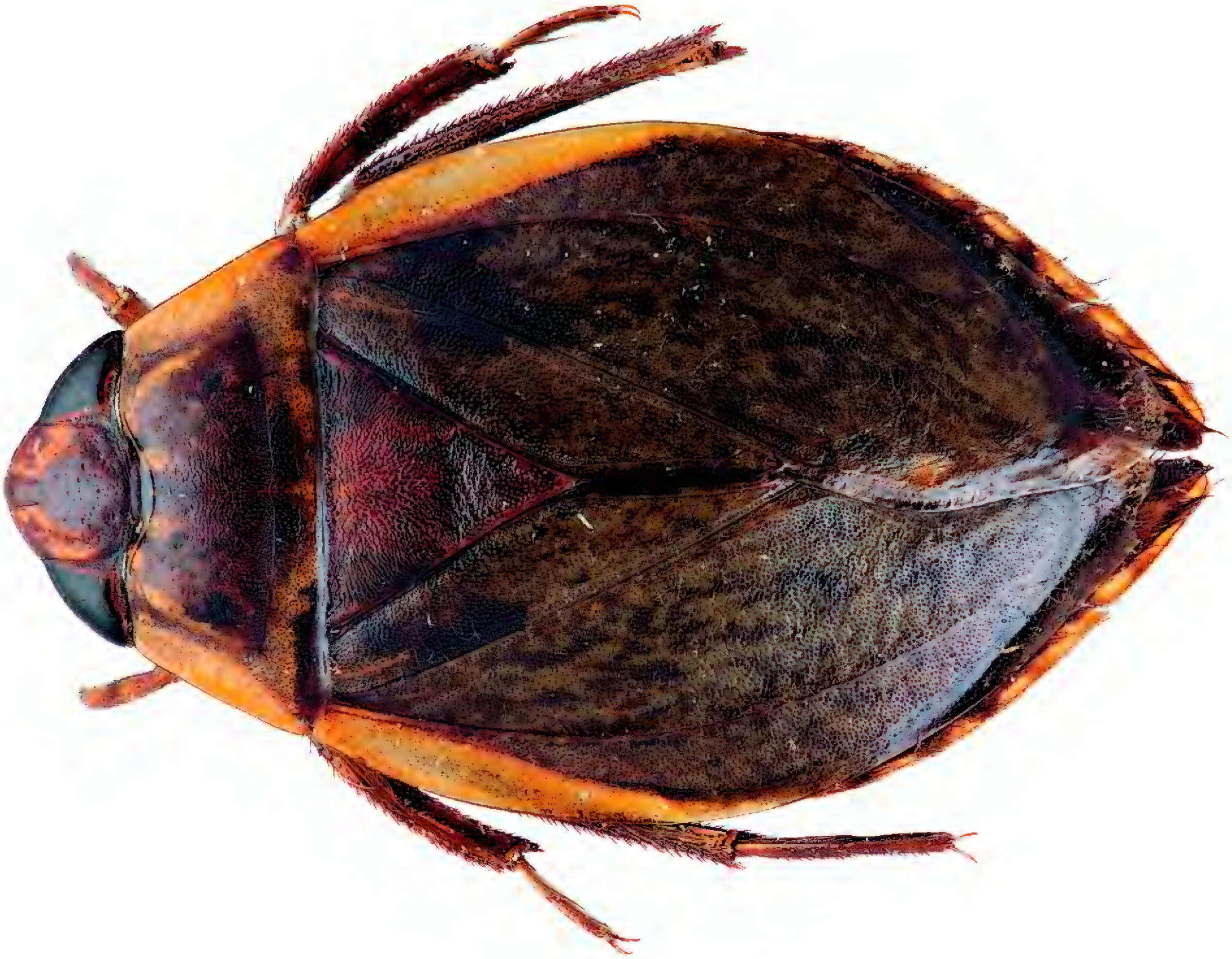


Figure 1. *Diplonychus eques* (Dufour, 1863), specimen from Lake Aitinyo, Doberai Peninsula, New Guinea, dorsal view (image courtesy Dmitry Telnov, Rīga, Latvia).

INDONESIA, West Papua Prov., Kaimana 47 km E, Triton Bay, Kamaka (former Warika) village environs, Lake Kamakawalar and surroundings, 3°46’22”S, 134°12’02”E, 60-310 m, little ditch in primary lowland forest on limestone, 08.09.2010.

Limnometra lipovskyi Hungerford et Matsuda, 1958

Studied material: 1♂ & 20♀ INDONESIA, West Papua Prov., Kaimana 30–40 km E, Triton Bay, River Lengguru valley upriver from Oray village, 3°43’26”S, 134°06’06”E, ~150 m, limestone creek, 13.09.2010; 2♂ INDONESIA, West Papua Prov., Kaimana 47 km E, Triton Bay, Kamaka (former Warika) village environs, Lake Kamakawalar and surroundings, 3°46’22”S, 134°12’02”E, 60–310 m, little ditch in primary lowland forest on limestone, 08.09.2010.

Tenagogonus sp.

Studied material: 1♂ (brachypterous) INDONESIA, West Papua Prov., Kaimana 30–40 km E, Triton Bay, River Lengguru valley upriver from Oray village, 3°43’26”S, 134°06’06”E, ~150 m, limestone creek, 13.09.2010.

Hydrometridae Billberg, 1820

Hydrometra sp.

Studied material: 3 specimens INDONESIA E, W New Guinea, Doberai Peninsula, Ayamaru vill. 27 km SE, Aitinyo (Uter) lakeside, 1°26’01”S, 132°23’10”E, ~175-177 m, from aquatic vegetation, 04.09.2015.

Nepidae Latreille, 1802

Ranatra biroi Lundblad, 1933 (Figs 2–8)

Studied material: 1♂ INDONESIA E, West New Guinea, Doberai Peninsula, Ayamaru vill. 27 km SE, Aitinyo (Uter) lakeside, 1°26’01”S, 132°23’10”E, ~175-177 m, from aquatic vegetation, 04.09.2015.

Notes: First record from Doberai Peninsula, hitherto the westernmost record for this species. The studied specimen of this transpapuan species is slightly different in external morphology from what is known from the literature (Lundblad 1933; Lansbury 1972). Frons and vertex convex, distinctly raised over compound eye in lateral view (Fig. 3). Compound eyes comparatively small (Figs 2–4), not as in Lansbury (1972, figs 200–201). Prothorax on either side of the flat median carina is feebly longitudinally emarginate, margins of the emargination not carinate (Fig. 4). Mesoventrite is either subtrapezoid (Fig. 5), not circular. Metaventrite slightly convex medially (in lateral aspect), not “raised” as in Lansbury (1972). The variability considered not sufficient for delimiting a new subspecific taxon, since shape of male genitalia in studied specimen (Figs 6–8) agrees with those in typical *R. biroi*.

Ranatra megalops Lansbury, 1972

Studied material: 3♂ & 2♀ INDONESIA, West Papua Prov., Kaimana 30–40 km E, Triton Bay, River Lengguru valley upriver from Oray village, 3°43’26”S, 134°06’06”E, ~150 m, ditch in the primary forest on limestone and sago swamp, 13.09.2010.

Notonectidae Leach, 1815

Anisops sp.

Studied material: several specimens INDONESIA, West Papua Prov., Kaimana 47 km E, Triton Bay, Kamaka (former Warika) village environs, Lake Kamakawalar, 3°45’33”S, 134°12’05”E, 90 m, 2nd pool in primary lowland rainforest, 09.09.2010.

Anisops stali Kirkaldy, 1904

Studied material: 1♀ INDONESIA, West Papua Prov., Kaimana 47 km E, Triton Bay, Kamaka (former Warika) village environs, Lake Kamakawalar and surroundings, 3°46’22”S, 134°12’02”E, 60–310 m, little ditch in primary lowland forest on limestone, 08.09.2010.

Enithares sp.

Studied material: several specimens INDONESIA, West Papua Prov., Kaimana 47 km E, Triton Bay, Kamaka (former Warika) village environs, Lake Kamakawalar, 3°45’33”S, 134°12’05”E, 90 m, 2nd pool in primary lowland rainforest, 09.09.2010.

Enithares bakeri Brooks, 1948

Studied material: 1♂ INDONESIA E, North Moluccas, Halmahera N, Lake Lina, SW lakeside, 1°31’38”N, 127°50’15”E, 205 m, lake & sago swamp, 04.07.2013.

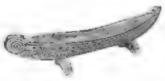
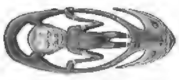
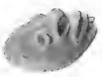
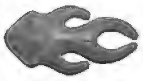
Note: A species distributed in the Philippines and on several Indonesian islands such as Sulawesi etc. (Insecta in GBIF Secretariat 2019). According to Polhemus (2020) this is perhaps the most widespread of any *Enithares* species occurring on the insular systems of Southeast Asia.

Enithares elongata Lansbury, 1974

Studied material: 2♂ INDONESIA E, New Guinea, Papua Prov., Sentani, Cyclops Mts., 02°32’04”S, 140°30’47”E, 550 m, perennial stream, headwater, 03.04.2018.

Enithares megalops Lansbury, 1968

Studied material: 1♂ INDONESIA, West Papua Prov., Onin Peninsula, Fak-Fak 5-7 km N, 2°53’26”S, 132°18’22”E, 300-400 m, creek, 23.09.2010; 1♂ &

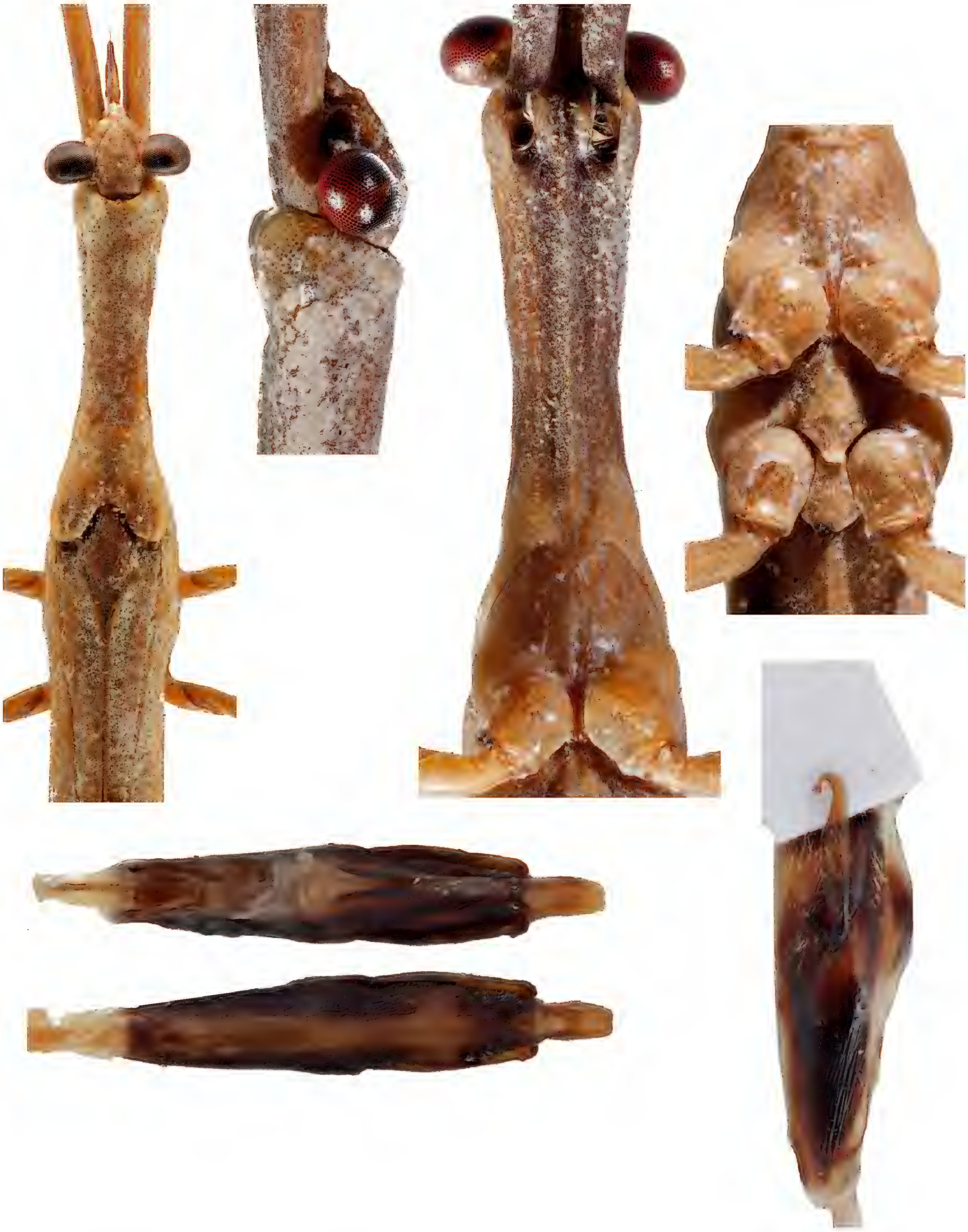





3♀ INDONESIA, West Papua Prov., Kaimana 30–40 km E, Triton Bay, River Lengguru valley upriver from Oray village, 3°43'26"S, 134°06'06"E, ~150 m, limestone creek, 13.09.2010; 3 specimens INDONESIA, West Papua Prov., Kaimana 47 km E, Triton Bay, Kamaka (former Warika) village environs, Lake Kamakawalar and surroundings, 3°46'22"S, 134°12'02"E, 60–310 m, little ditch in primary lowland forest on limestone, 08.09.2010.

Veliidae Amyot et Serville, 1843

Rhagovelia transbintuni D. Polhemus et J. Polhemus, 2011

Studied material: 2♂ & 2♀ INDONESIA, West Papua Prov., Kaimana 30–40 km E, Triton Bay, River Lengguru valley upriver from Oray village, 3°43'26"S, 134°06'06"E, ~150 m, limestone creek, 13.09.2010.



Figures 2–8. *Ranatra biroi* Lundblad, 1933, ♂ from Lake Aitinyo, Doberai Peninsula, New Guinea. 2 – Forebody, dorsal view; 3 – Head and anterior part of thorax, lateral view; 4 – Thorax, ventral view; 5 – Meso- and metaventrite, ventral view; 6–8 – Male accessory genitalia and paramere (8), different views [not to scale] (images courtesy Dmitry Telnov, Rīga, Latvia).

***Strongylovelia* sp.**

Studied material: 4 specimens INDONESIA, West Papua Prov., Kaimana 30–40 km E, Triton Bay, River Lengguru valley upriver from Oray village, 3°43'26"S, 134°06'06"E, ~150 m, limestone creek, 13.09.2010.

Discussion

The present paper discusses new distributional data on 18 taxa, including 13 species and 5 genus-rank identifications of Heteroptera. According to the GBIF's species datasets (Insecta in GBIF Secretariat 2019) and the most recent available publications on particular taxonomic groups (Andersen 1975; Polhemus & Polhemus 1998; 2011; Polhemus 2020), several of the discussed species are not yet reported outside the Papuan Region and are considered Papuan regional endemics in a strict (*Enithares elongata*, *E. megalops*, *Limnogonus darthulus*, *Ranatra biroi*, *R. megalops*, and *Rhagovelia transbintuni*) or a broad sense (*Limnometra kallisto*) (consider map 2 for zoogeographic definitions). However, none of these taxa are classified among the taxa that define Papuan areas of endemism (Polhemus *et al*. 2004; Polhemus 2020).

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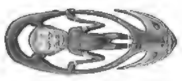
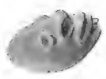
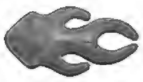
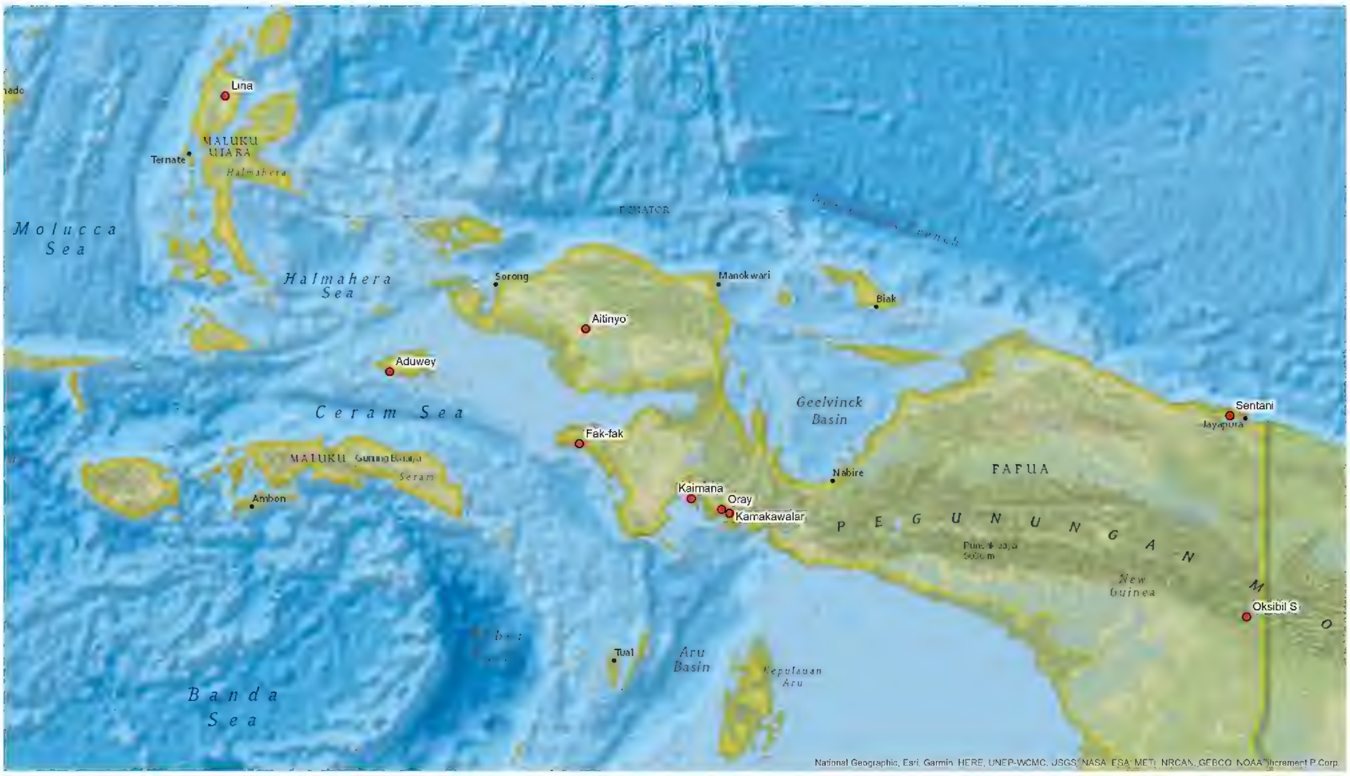
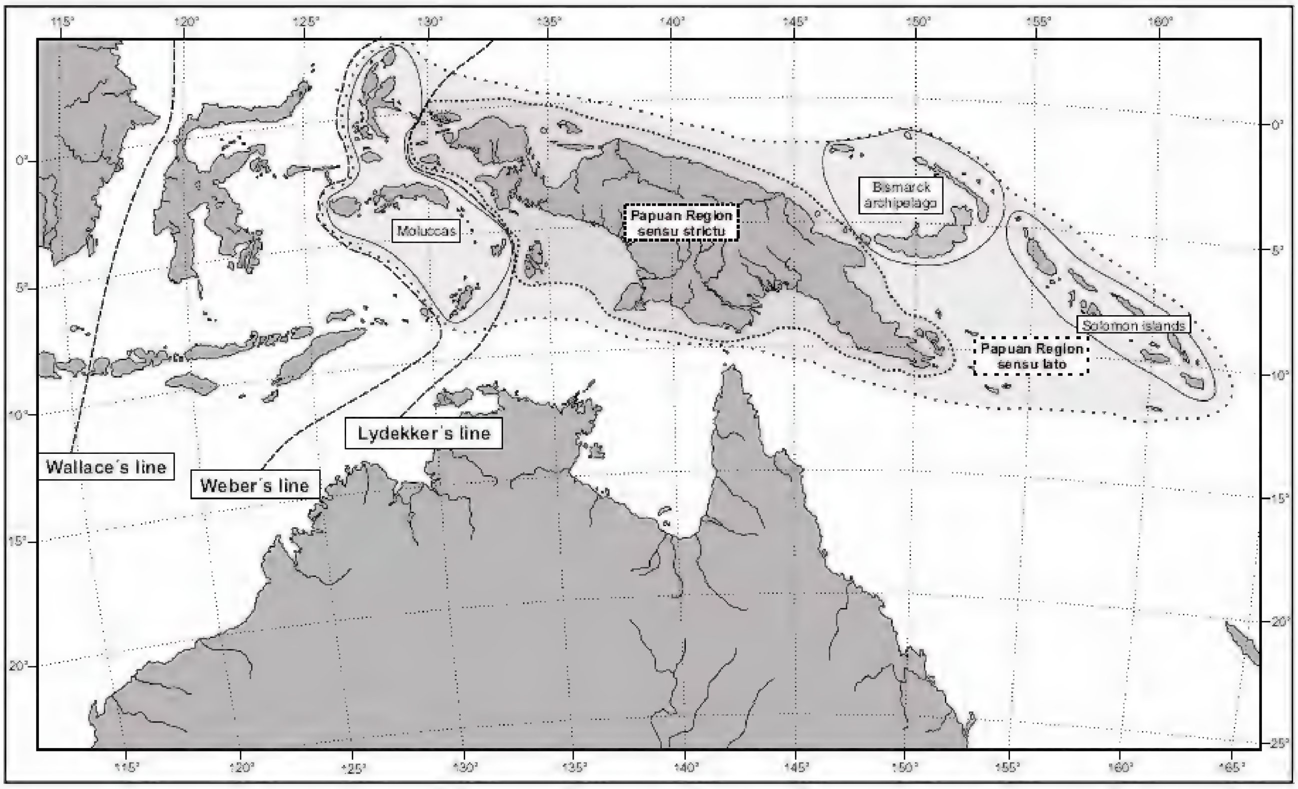








Map 1. The localities mentioned in the present paper shown on the National Geographic World Map (National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.).



Map 2. The Papuan region in strict and broad senses and the surrounding regions, showing important zoogeographic lines (redrawn from the Times Atlas of the World (1994), with modifications by Riedel (2002)).